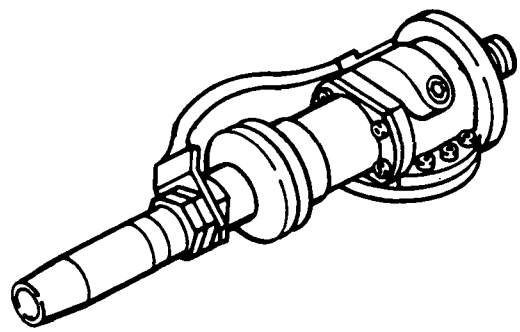
Miller®

August 1990 FORM: OM-1556A

MODEL: MTXC 3501M
MTX 3502
MTXW 5001
ROBOT GUNS



OWNER'S MANUAL

IMPORTANT: Read and understand the entire contents of both this manual and the power source manual used with this unit, with special emphasis on the safety material throughout both manuals, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.

MILLER ELECTRIC Mfg. Co.
A Miller Group Ltd., Company

P.O. Box 1079
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TB-114 276

PRINTED IN U.S.A

MILLER'S TRUE BLUE™ LIMITED WARRANTY

Effective January 1, 1992
(Equipment with a serial number preface of "KC" or newer)

This limited warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, MILLER Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new MILLER equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by MILLER. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, MILLER will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. MILLER must be notified in writing within thirty (30) days of such defect or failure, at which time MILLER will provide instructions on the warranty claim procedures to be followed.

MILLER shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, and are as follows

1. 5 Years Parts – 3 Years Labor
   - Original main power rectifiers
2. 3 Years — Parts and Labor
   - Transformer/Rectifier Power Sources
   - Plasma Arc Cutting Power Sources
   - Semi-Automatic and Automatic Wire Feeders
   - Robots
3. 2 Years — Parts and Labor
   - Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
4. 1 Year — Parts and Labor
   - Motor Driven Guns
   - Process Controllers
   - Water Coolant Systems
   - HF Units
   - Grids
   - Spot Welders
   - Load Banks
   - SDX Transformers
   - Running Gear/Trailers
   - Field Options

   (NOTE: Field options are covered under True Blue™ for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
5. 6 Months — Batteries
6. 90 Days — Parts and Labor
   - MIG Guns/TIG Torches
   - Plasma Cutting Torches
   - Remote Controls
   - Accessory Kits
   - Replacement Parts

MILLER'S True Blue™ Limited Warranty shall not apply to:

1. Items furnished by MILLER, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
2. Consumable components; such as contact tips, cutting nozzles, contactors and relays.
3. Equipment that has been modified by any party other than MILLER, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at MILLER'S option: (1) repair; or (2) replacement; or, where authorized in writing by MILLER in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized MILLER service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. MILLER'S option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a MILLER authorized service facility as determined by MILLER. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier**. Assistance for filing or settling claims may be obtained from distributor and/or equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide Model Designation and Serial or Style Number.

Use the following spaces to record Model Designation and Serial or Style Number of your unit. The information is located on the rating label or nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

May 13, 1991 FORM: OM-1556A

ERRATA SHEET

After this manual was printed, refinements in equipment design occurred. This sheet lists exceptions to data appearing later in this manual.

AMENDMENT TO SECTION 2 – SPECIFICATIONS

Amend MTXC 3501M welding gun view in Figure 2-1. Dimension Information

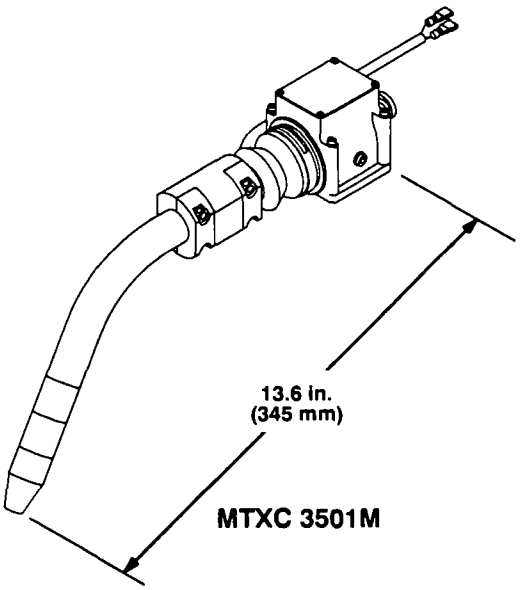

Figure 2-1. Dimension Information

AMENDMENT TO SECTION 3 – INSTALLATION

Amend Figure 3-2. MTXC 3501M Gun Installation

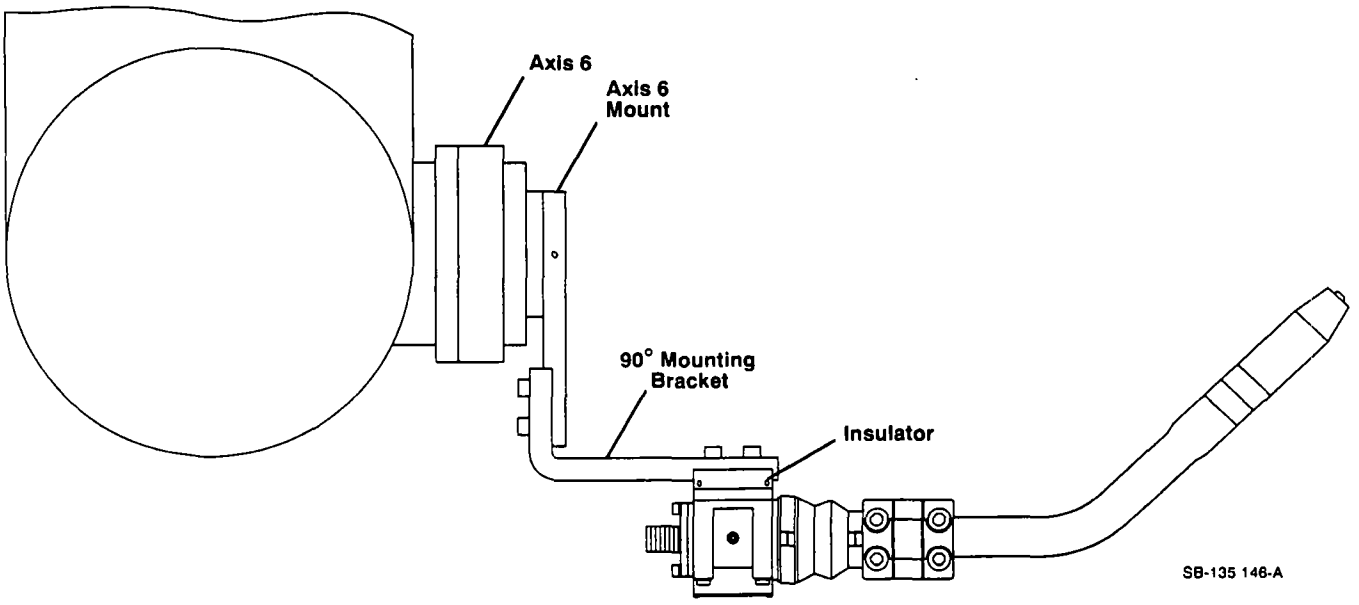

Figure 3-2. MTXC 3501M Gun Installation

AMENDMENT TO SECTION 5 – PARTS LIST

Amend Figure 5-2. MTXC 3501M Air Cooled Gun

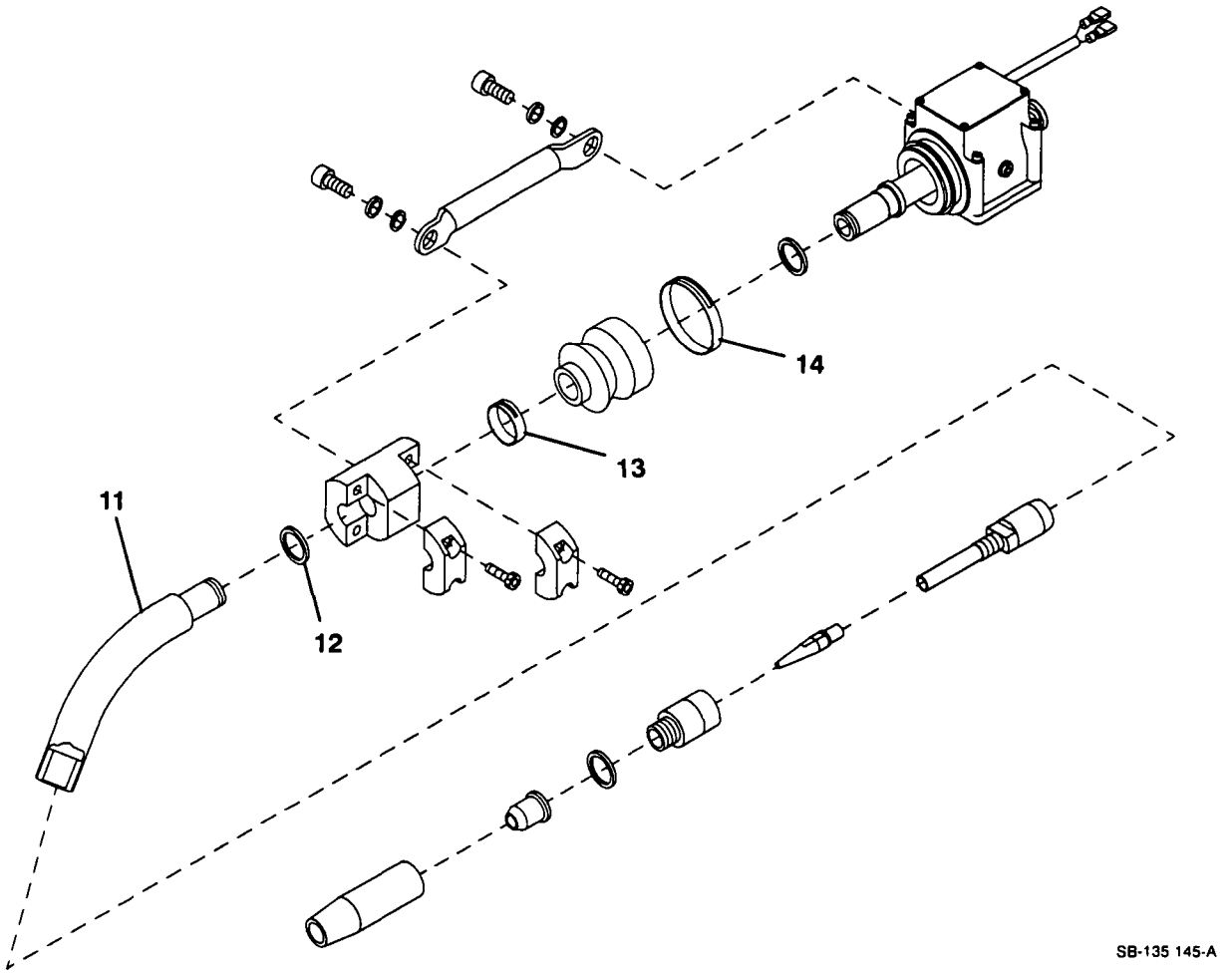

Figure 5-2. MTXC 3501M Air Cooled Gun

Amend Parts List as follows:

**	Part No.	Replaced With	Description	Quantity
10-	132 296	♦143 697	MTXC-3501 M, air cooled gun	
10-4	133 994	143 693	NOZZLE HOLDER ASSEMBLY	1
10-7	133 997	108 776	INSULATION BUSHING	1
10-11	133 993	143 692	NOZZLE ASSEMBLY	1
10-12	Added	143 696	O-RING (used on nozzle assembly)	1
10-13	Added	143 694	CLAMP, band	1
10-14	Added	143 695	CLAMP, band	1

**First digit represents page no – digits following dash represent item no.

♦All gun parts remain the same with listed exceptions.

When ordering replacement parts refer to view on this errata sheet and Fig 5-2 in manual for correct identity of parts.

RECEIVING-HANDLING

Before unpacking equipment, check carton for any damage that may have occurred during shipment. File any claims for loss or damage **with the delivering carrier.** Assistance for filing or settling claims may be obtained from the distributor and/or the equipment manufacturer's Transportation Department.

When requesting information about this equipment, always provide the Model Description and Serial or Style Number.

Use the following spaces to record the Model Designation and Serial or Style Number of your unit. The information is located on the data card or the nameplate.

Model _____

Serial or Style No. _____

Date of Purchase _____

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SECTION 1 – SAFETY PRECAUTIONS AND SIGNAL WORDS

1-1. GENERAL INFORMATION AND SAFETY

A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 - Safety Rules For Operation Of Arc Welding Power Source in the welding power source Owner's Manual.

1-2. SAFETY ALERT SYMBOL AND SIGNAL WORDS

The following safety alert symbol and signal words are used throughout this manual to call attention to and identify different levels of hazard and special instructions.

This safety alert symbol is used with the signal words WARNING and CAUTION to call attention to the safety statements.

WARNING statements identify procedures or practices which must be followed to avoid serious personal injury or loss of life.

CAUTION statements identify procedures or practices which must be followed to avoid minor personal injury or damage to this equipment.

IMPORTANT *statements identify special instructions necessary for the most efficient operation of this equipment.*

SECTION 2 – SPECIFICATIONS

Table 2-1. Specifications

Model	Rating: 50% Duty Cycle With CO_2	Wire Diameter Capacity	Cooling Method	Weight	
				Net	Ship
MTX 3502	350 Amperes	.030 - 1/16 in. (0.8 -1.6 mm)	Air	2.3 lbs. (1 kg)	3.2 lbs. (1.5 kg)
MTXC 3501M				2.6 lbs. (1.2 kg)	3.5 lbs. (1.6 kg)
MTXW 5001	500 Amperes	.045 and 1/16 in. (1.1 and 1.6 mm)	Water	3.7 lbs. (1.7 kg)	4.6 lbs. (2.1 kg)

2-1. DUTY CYCLE

The duty cycle of a welding gun is the percentage of a ten minute period that the gun can safely be operated at a give output without causing overheating and damage to the gun. These guns are rated at 50% duty cycle using CO_2 shielding gas. This means that the gun can be operated for five consecutive minutes. The remaining five minutes the gun should be idle to permit proper cooling.

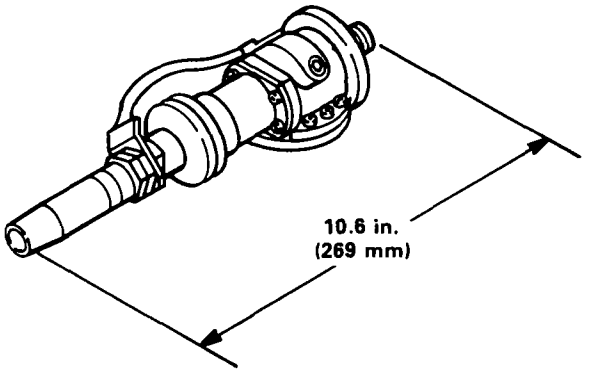
CAUTION: EXCEEDING THE RATED AMPERAGE WITH CO_2 OR FAILING TO REDUCE THE WELDING AMPERAGE OR DUTY CYCLE WHEN USING MIXED SHIELDING GAS can damage gun.

- *Do not exceed rated amperage when using CO_2.*
- *Reduce duty cycle when using mixed shielding gases.*

2-2. DESCRIPTION

These guns are specifically designed for automatic robotic welding.

The term welding gun is used when Gas Metal Arc Welding (GMAW) is done. The guns are shipped with the necessary components for a specific wire size; however, through minor parts changes, each gun can be used with various sizes of wire.



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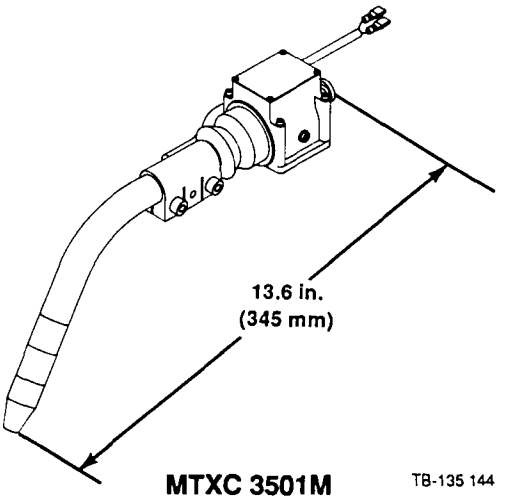

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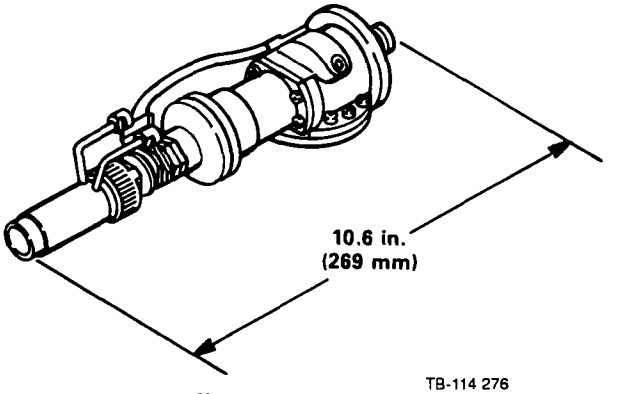

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MTXW 5001

Figure 2-1. Dimension Information

SECTION 3 – INSTALLATION

CAUTION: IMPROPER ROBOT TOOL POINT ADJUSTMENT can damage welding gun and robot.

- *After welding gun installation is completed, see Set-Up Procedure section of robot Owner's Manual for tool point procedures.*

3-1. GUN PREPARATION

Select contact tube for wire size used, and proceed as follows:

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

1. Remove nozzle
2. Install desired contact tube and nozzle onto gun.

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

1. Route cable through supports on robot. The cable connector end goes to the wire drive assembly while the remaining end goes to the gun.
2. Install cable connector into wire drive assembly (see Motor/Drive Assembly Owner's Manual).
3. Slide welding gun onto liner protruding from cable until liner seats inside gun.
4. Mark liner flush with gun body and slide gun off liner.
5. Measure distance between mark made on liner in Step 4 and brass nut on cable.
6. The liner needs to be shortened by the length measured in Step 5. Cut off measured length from end of liner.

3-3. MTX 3502 AND MTXW 5001 GUN INSTALLATION (Figure 3-1)

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

IMPORTANT: *If a 30° mounting bracket is used, the bracket must be installed with offset to the right when viewing the Phi axis mount. Be sure phenolic insulator is between gun and bracket.*

1. If a 30° mounting bracket is used, secure bracket to gun using supplied socket head screws.
2. Secure gun to Phi axis (or Axis 5) mount using supplied socket head screws (see Figure 3-1).

   If a 30° mounting bracket is used, secure bracket to manipulator Phi axis mount using supplied socket head screws.
3. Slide liner from outlet cable into gun.
4. Secure outlet cable to adapter by tightening nut from cable onto adapter.
5. Connect touch sensor leads from gun to leads from outlet cable. Connect leads from outlet cable to cord at gas/current sensing control or to matching connector at robot manipulator. Polarity is not important.

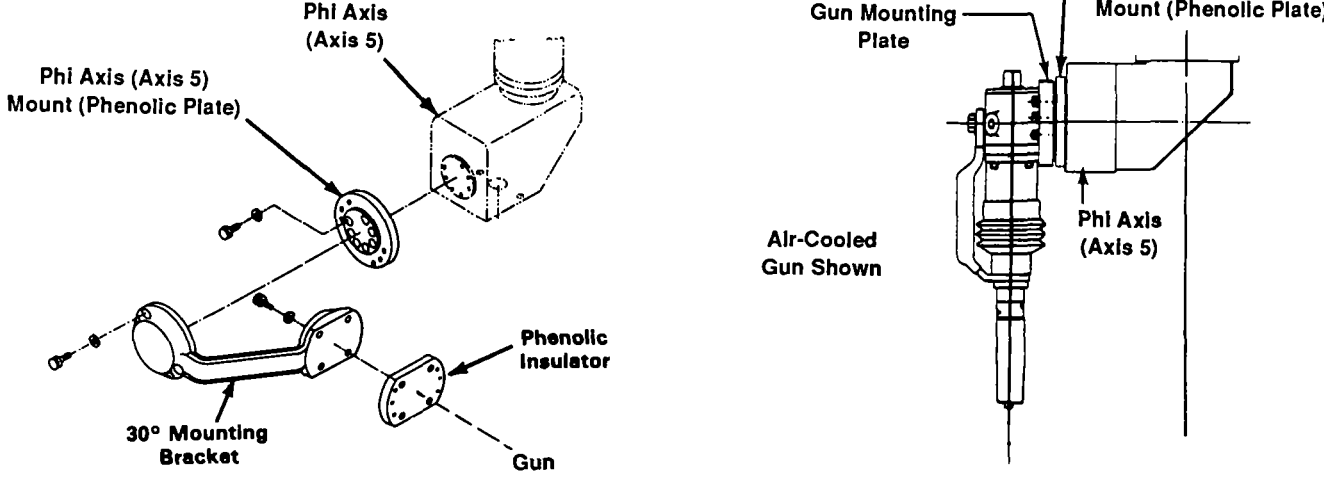

Figure 3-1. MTX 3502 And MTXW 5001 Gun Installation

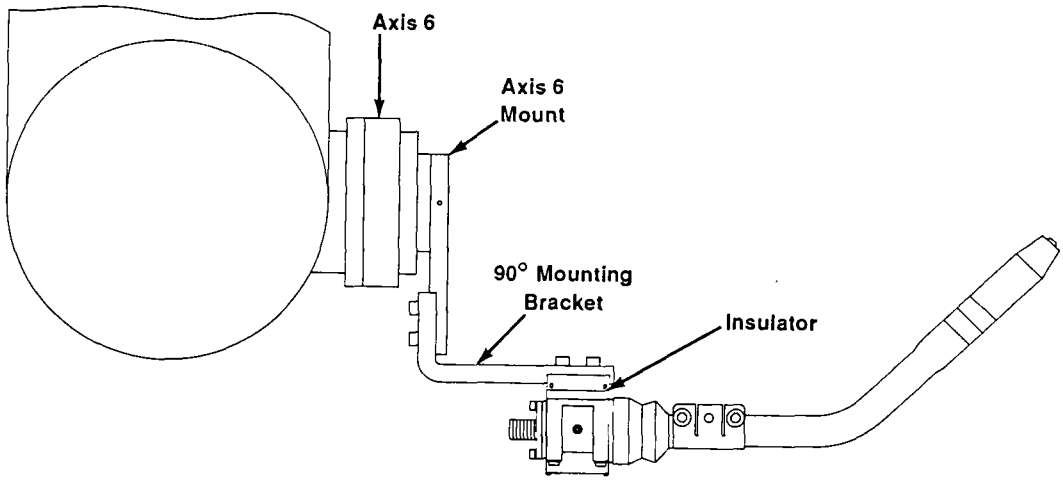

Figure 3-2. MTXC 3501M Gun Installation

3-4. MTXC 3501M GUN INSTALLATION (Figure 3-2)

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

1. Install and secure insulator to gun using the supplied flat washers, lock washers, and socket head screws.
2. Secure 90° mounting bracket to gun using supplied socket head screws.
3. Secure 90° bracket to Axis 6 mount using supplied socket head screws.
4. Secure outlet cable to adapter by tightening nut from cable onto adapater.
5. Connect touch sensor leads from gun to leads from outlet cable. Connect leads from outlet cable to cord at gas/current sensing control or to matching connector at robot manipulator. Polarity is not important.

3-5. WATER CONNECTIONS (Water-Cooled Models Only)

CAUTION: OVERHEATING of Gas Metal Arc Welding gun can damage gun.

- *If using a water cooled gun and recirculating coolant system, make connections directly from the coolant system to gun hoses.*
- *Check entire cooling system periodically for proper coolant flow.*

A. Connections To Gun

1. Push quick-disconnect fitting on water hose onto barbed fitting at gun (see Figure 3-3) until locking ring snaps down.
2. To release hose, push locking ring up until disengaged; pull hose from fitting.

B. Connections To Coolant Supply

1. Self-Contained, Recirculating Coolant System

CAUTION: INCORRECT COOLANT will damage gun.

- *Use only coolant specified in recirculating coolant system manual.*
- *Do not use tap water, automotive antifreeze, or plain distilled or deionized water.*
- *Use MILLER Part No. 109 973 water soluble coolant or a mixture of pure commercial ethylene or propylene glycol and/or water soluble lubricants in distilled or deionized water.*

Failure to comply with these instructions may void the warranty.

a. Route hoses from gun to coolant system.

b. Connect hoses to coolant system input and output fittings. The hoses have 5/8-18 left-hand male fittings.

2. Utility Or Building Coolant System
   a. Route hoses from gun to coolant supply and drain.
   b. Connect one hose to coolant supply. Both hoses have 5/8-18 left-hand male fittings.
   c. Route remaining hose to a proper drain.

3-6. FIELD INSTALLATION OF WATER-COOLED NOZZLE ONTO AIR-COOLED GUN (MTX 3502 Models Only) (Figures 3-3 And 3-4)

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

WELDING WIRE can cause puncture wounds.

- *The welding wire and all metal parts in contact with it are electrically energized when the welding power source contactor is energized.*

Changing the air-cooled gun to a water-cooled gun can be done without removing the gun from the robot. To change the gun from air-cooled to water-cooled, proceed as follows:

1. Remove parts indicated in 3-4. Retain these parts for future use.
2. Installed supplied water-cooled nozzle parts in the order shown in Figure 3-3.
3. See Section 3-5 for water connections.

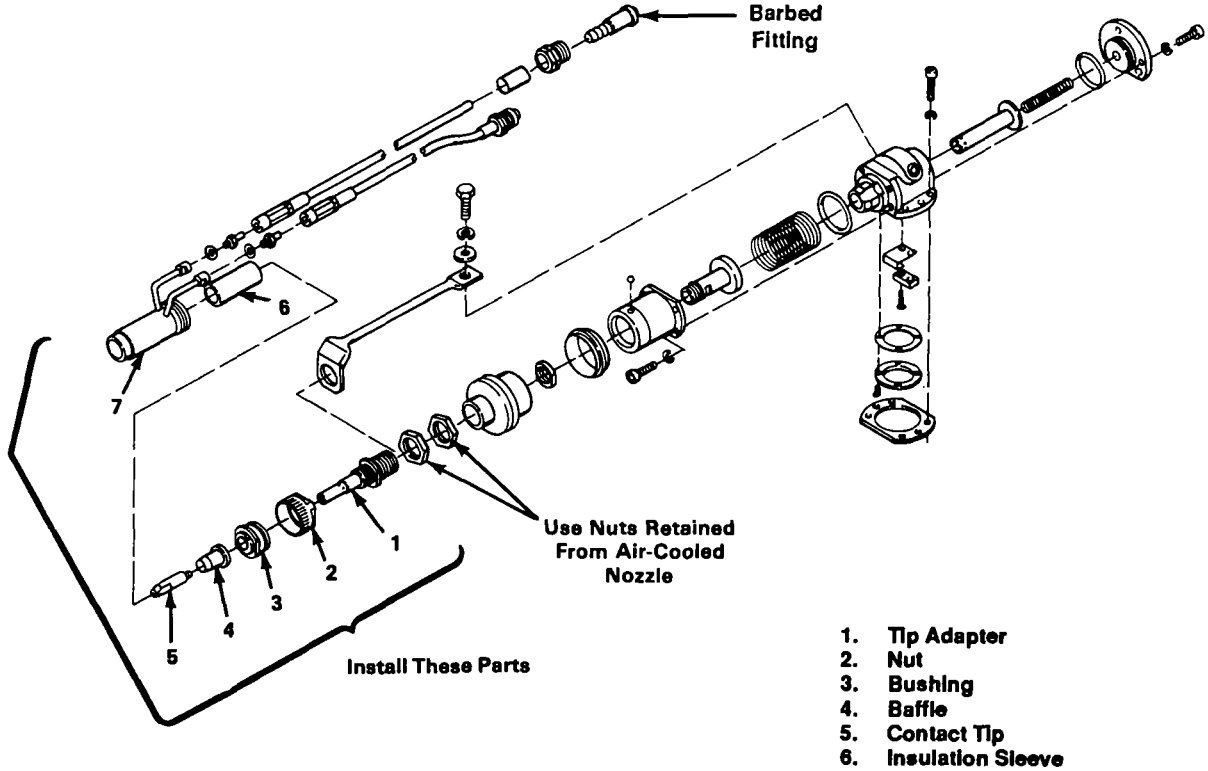

Figure 3-3. Installation Of Water-Cooled Nozzle

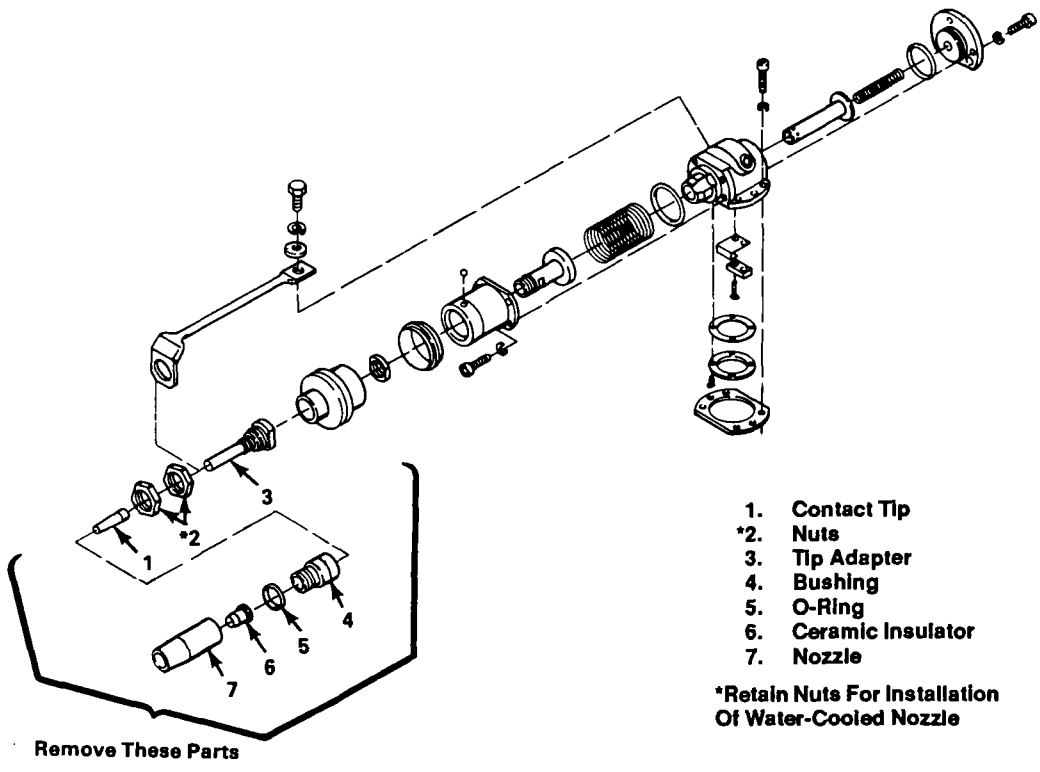

Figure 3-4. Removal Of Air-Cooled Nozzle

SECTION 4 – MAINTENANCE

4-1. INSPECTION AND UPKEEP

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

WELDING WIRE can cause puncture wounds.

- *The welding wire and all metal parts in contact with it are electrically energized when the welding power source contactor is energized.*

Usage and shop conditions determine the frequency and type of maintenance required. At minimum, inspect welding gun and outlet cable monthly as follows:

1. Inspect gun and phenolic plates for broken areas, cracks, and loose parts; tighten, repair, and replace as required.
2. Carefully remove weld spatter or dirt from around the nozzle opening.
3. Repair or replace as required all hoses and cables; give particular attention to frayed and cracked insulation and areas where cables enter equipment.
4. Remove grease and dirt from components, and moisture from electrical parts and cables.
5. Clean outlet cable liner using compressed air whenever the wire is removed.

CAUTION: FLYING DIRT AND METAL PARTICLES can injure personnel and damage equipment.

- *Point outlet cable liner only in a safe direction away from personnel and equipment when cleaning with compressed air.*

4-2. CONTACT TUBE REPLACEMENT

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

WELDING WIRE can cause puncture wounds.

- *The welding wire and all metal parts in contact with it are electrically energized when the welding power source contactor is energized.*

1. Remove nozzle.
2. Cut off any portion of welding wire which extends beyond end of contact tube. Manually retract welding wire.
3. Remove contact tube.
4. Install new contact tube and reinstall nozzle.
5. Manually thread welding wire out of new contact tube.

4-3. CHANGING WIRE SIZE

When changing wire size, it is necessary to change the contact tube and wire drive rolls, and may be necessary to change the outlet cable. Obtain parts for wire size desired, and proceed as follows:

WARNING: ELECTRIC SHOCK can kill; ROBOT ARM MOVEMENT can cause serious injury or death; INCORRECT PROCEDURES can cause injury.

- *Do not touch live electrical parts.*
- *Shut down welding power source and robot control, and disconnect input power employing lockout/tagging procedures.*

Lockout/tagging procedures consist of removing input power plug from receptacle, padlocking line disconnect switch(es) in open position, removing fuses from fuse box(es), or shutting off and red-tagging circuit breaker(s) or other disconnecting device(s).

MOVING PARTS can cause serious injury.

- *Keep away from moving parts.*

HOT SURFACES can cause severe burns.

- *Allow cooling period before touching gun.*

WELDING WIRE can cause puncture wounds.

- *The welding wire and all metal parts in contact with it are electrically energized when the welding power source contactor is energized.*

1. Cut off welding wire at contact tube, and retract from gun.
2. Disconnect touch sensor leads, and remove outlet cable from gun.
3. Disconnect touch sensor leads, and remove outlet cable from wire drive assembly.
4. Prepare and install new outlet cable as instructed in Section 3-2.
5. Slide liner from outlet cable into gun.
6. Secure outlet cable to adapter by tightening nut from cable onto adapter.
7. Connect touch sensor leads. Polarity is not important.
8. Remove nozzle and contact tube from gun.
9. Install new contact tube, and reinstall nozzle onto gun.
10. Thread welding wire.

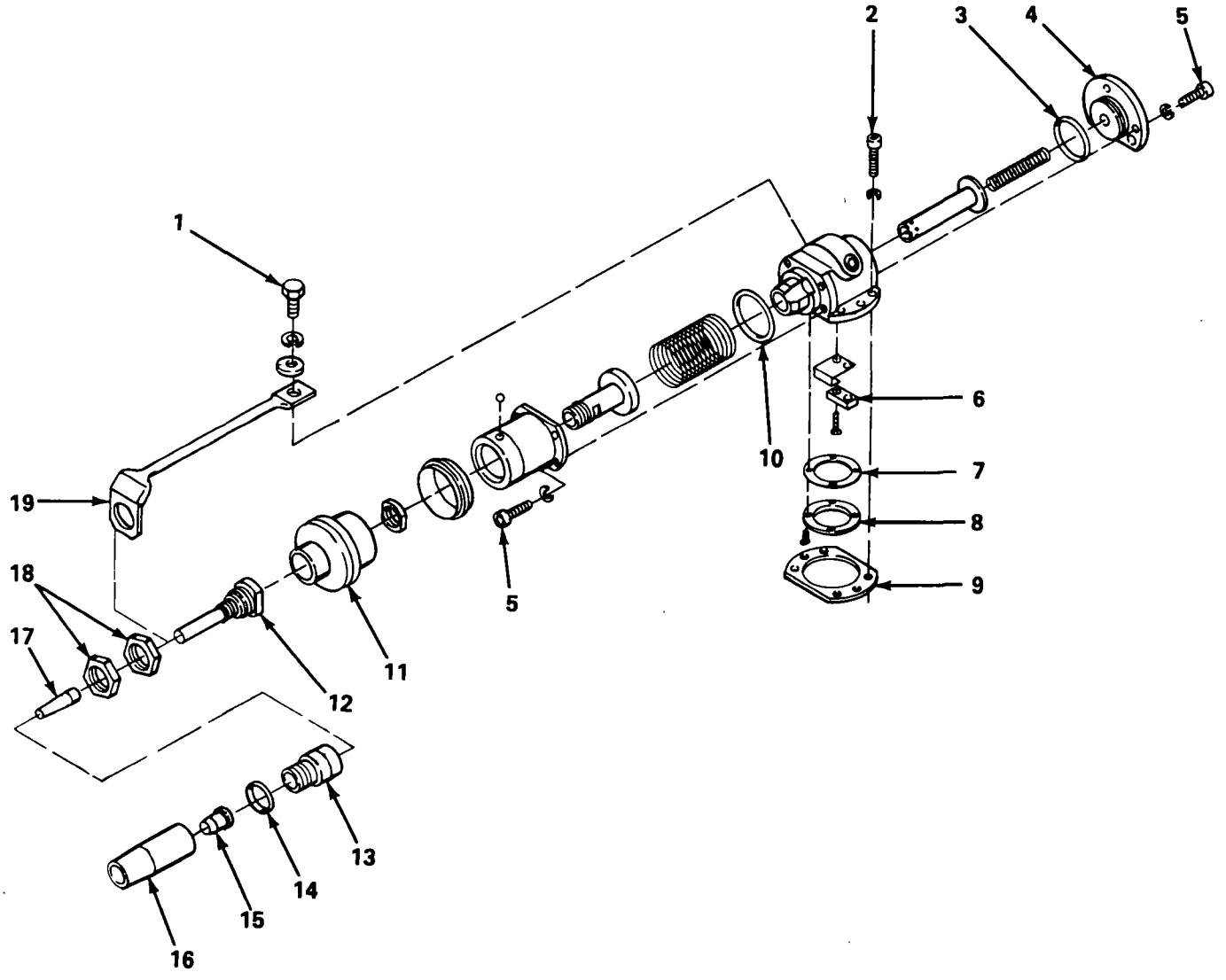

Figure 5-1. MTX 3502 Air Cooled Gun

Item No.	Part No.	Description	Quantity
	113 883	**Figure 5-1. MTX 3502 Air Cooled gun**	
1	115 527	SCREW, cap - hex hd 8MM x 1.25 x 15MM	1
2	115 526	SCREW, cap - skt hd M5 x .8 x 14mm	6
3	108 780	0-RING (S-25)	1
4	114 249	ADAPTER, brs	1
5	115 524	SCREW, cap - skt hd 4MM x .7 x 12MM	6
6	108 772	MICROSWITCH	1
7	108 773	PACKING	1
8	108 774	SWITCH COVER	1
9	108 775	SHIM	1
10	108 779	O-RING (S-32)	1
11	108 766	BOOT, rbbr	1
12	108 768	ADAPTER, tip	1
13	108 776	INSULATION, bush	1
14	108 778	O-RING (P12)	1
15	108 777	INSULATOR, cer	1
16	108 784	NOZZLE (No. 8)	1
16	♦110 854	NOZZLE (No. 7 short)	1
16	♦108 793	NOZZLE (No. 8 long)	1
16	♦108 785	NOZZLE (No. 10)	1
16	♦112 471	NOZZLE (No. 6 short)	1
16	♦112 470	NOZZLE (No. 6 long)	1
16	♦112 469	NOZZLE (No. 7 long)	1
16	♦112 468	NOZZLE (fine)	1
17	108 789	CONTACT TIP (Q0.9)	1
17	♦108 788	CONTACT TIP (Q0.8)	1
17	♦108 786	CONTACT TIP (Q1.2)	1
17	♦108 790	CONTACT TIP (Q1.6)	1
17	♦129 886	CONTACT TIP, .023 wire	1
18	108 767	NUT	2
19	114 251	POWER SUPPLY WIRE, (consisting of)	1
	108 770	· PROTECTION TUBE	1

♦Optional Equipment

Item No.	Part No.	Description	Quantity
	132 296	**Figure 5-2. MTXC-3501M Air Cooled Gun**	
1	133 992	WIRE ASSEMBLY, pwr supply	1
2	135 496	O-RING	2
3	133 995	HOOD	1
4	133 994	NOZZLE HOLDER ASSEMBLY	1
5	133 996	TIP BODY	1
6	108 789	CONTACT TIP, (Q0.8)	1
6	♦108 788	CONTACT TIP, (Q0.8)	1
6	♦108 792	CONTACT TIP, (Q1.0)	1
6	♦108 786	CONTACT TIP, (Q1.2)	1
6	♦113 954	CONTACT TIP, .045 wire	1
6	♦108 790	CONTACT TIP, (Q1.6)	1
7	133 997	INSULATION BUSHING	1
8	108 778	O-RING, (P12)	1
9	108 777	INSULATOR, cer	1
10	108 784	NOZZLE, (No 8)	1
10	♦110 854	NOZZLE, (No 7 short)	1
10	♦108 793	NOZZLE, (No 8 long)	1
10	♦108 785	NOZZLE, (No 10)	1
11	133 993	NOZZLE ASSEMBLY	1

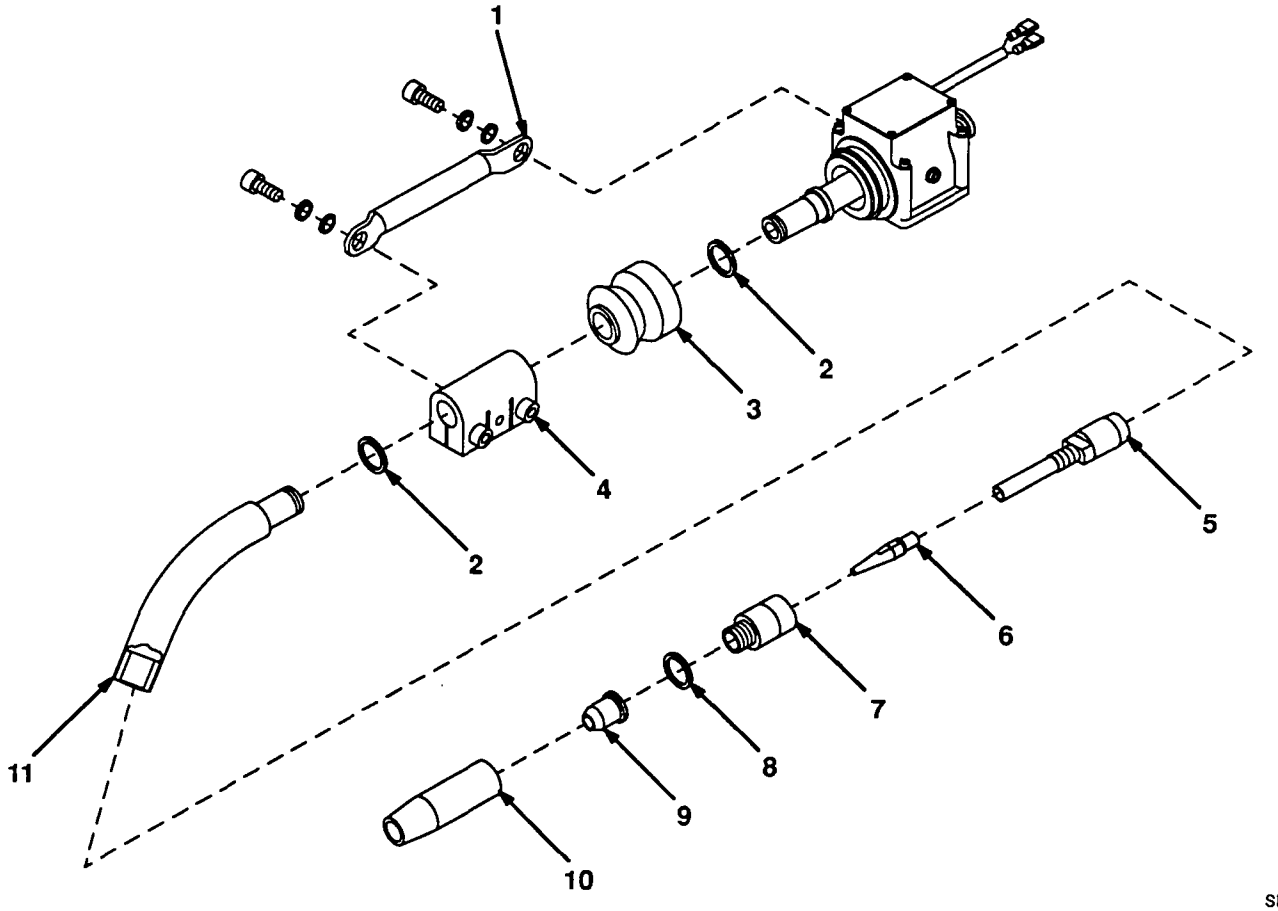

Figure 5-2. MTXC-3501M Air Cooled Gun

♦Optional Equipment

Item No.	Part No.	Description	Quantity
	113 882	**Figure 5-3. MTXW 5001 Water Cooled Gun**	
1	115 569	CONVERSION KIT, air to water cooled nozzle (consisting of)	1
2	114 250	· ADAPTER, tip	1
3	114 255	· NUT	1
4	114 252	· INSULATION, bush	1
5	114 253	· BAFFLE	1
6	129 886	· CONTACT TIP, .023 wire	1
6	113 954	· CONTACT TIP, .045 wire	1
6	113 955	· CONTACT TIP, .062 wire	1
7	114 251	· POWER SUPPLY CABLE, (consisting of)	1
	108 770	· PROTECTION TUBE	1
8	114 254	· INSULATION SLEEVE	1
9	114 526	· NOZZLE, water cooled	1
10	114 257	· FITTING, water	2
11	113 950	· WATER HOSE, (consisting of)	2
12	082 368	· · CLAMP, hose	1
13	010 607	· · FITTING, hose-brs nut 5/8-18 LH	1
14	056 851	· · FITTING, hose-brs barbed nipple 3/16 TBG	1
15	115 527	SCREW, cap - hex hd 8MM x 1.25 x 15MM	1
16	115 526	SCREW, cap - skt hd M5 x .8 x 14mm	6
17	108 780	0-RING (S-25)	1
18	114 249	ADAPTER, brs	1
19	115 524	SCREW, cap - skt hd 4MM x .7 x 12MM	6
20	108 772	MICROSWITCH	1
21	108 773	PACKING	1
22	108 774	SWITCH COVER	1
23	108 775	SHIM	1
24	108 779	O-RING (S-32)	1
25	108 766	BOOT, rbr	1
26	108 767	NUT	2
	120 975	TIP GAUGE	1

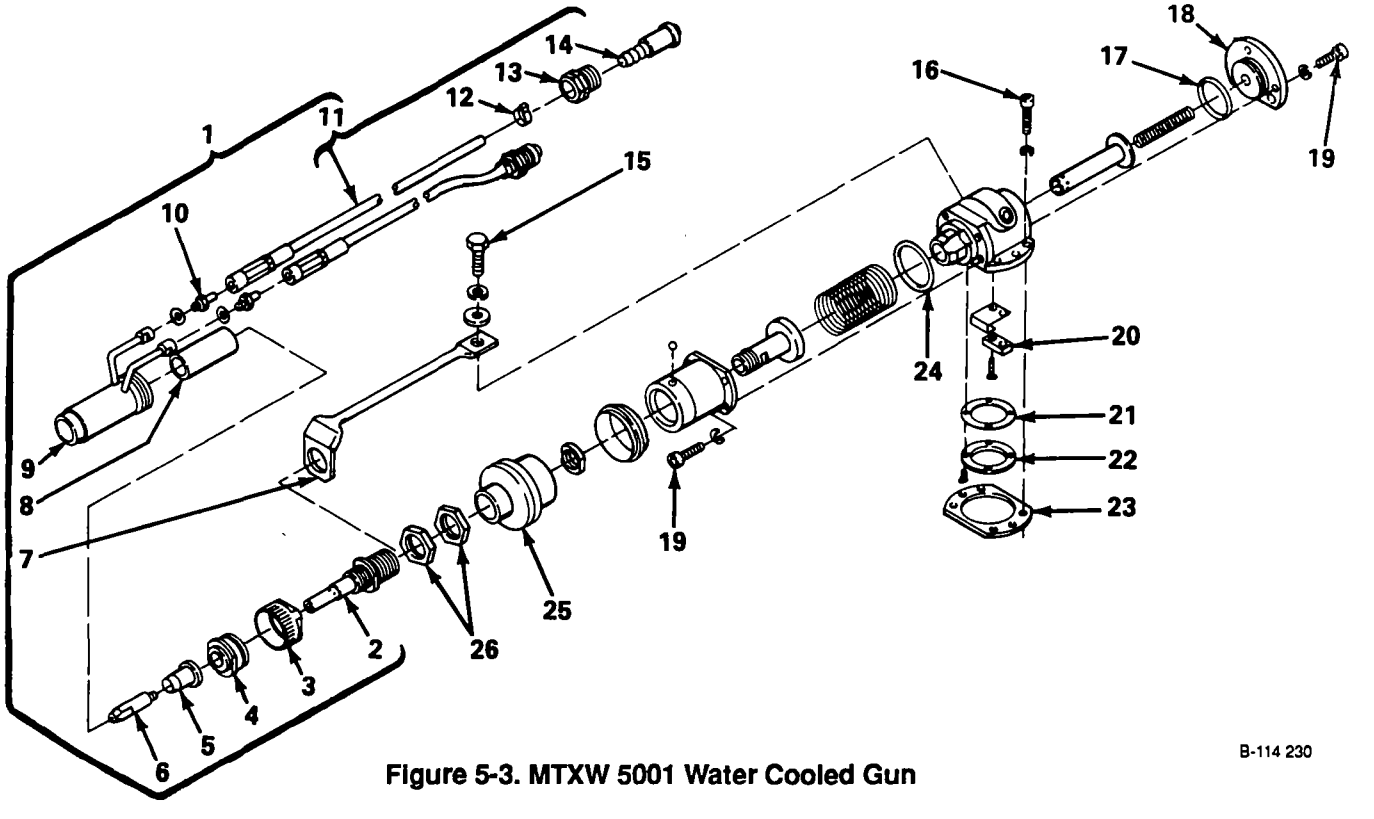

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Figure 5-3. MTXW 5001 Water Cooled Gun